

Room-Temperature Superconductor

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Condition for the existence of a superconductor:

$$c = \sqrt{\frac{Gm}{R}}$$

The orbital speed of the particles must be equal to light speed.

$$\frac{m}{R} = \frac{c^2}{G_e} \quad ; \quad G_e = \frac{q_e^2}{4\pi\epsilon_0 m_e^2} = 2.78 \times 10^{-32}$$

G_e -- Gravitational constant of the electron

$$A = \frac{m}{R} = 3.23 \times 10^{-16}$$

Superconductor composite substance:

$$m = m_1 + n.m_2$$

$$R = \frac{R_1 + R_{nm}}{2} \quad ; \quad V_{nm} = nV_m$$

$$R_{nm} = \sqrt[3]{nR_2}$$

$$R = \frac{R_1 + \sqrt[3]{nR_2}}{2} \quad \Leftrightarrow \quad 2 \frac{m_1 + n.m_2}{R_1 + \sqrt[3]{nR_2}} = A$$

$$x = 2m_1 - AR_1 \quad ; \quad y = 6m^2x^2 - A^3R_2^3$$

$$8n^3 m_2^3 + 12n^2 m_2^2 x + ny + x^3 = 0$$

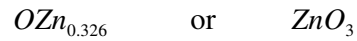
$$AR_1 > 2m_1$$

One Room-Temperature Superconductor

$$\text{O} \text{ -- } m_1 = 2.66 \times 10^{-26} \text{ kg} ; \quad R_1 = 2.24 \times 10^{-10} \text{ m}$$

$$\text{Zn} \text{ -- } m_2 = 1.1 \times 10^{-25} ; \quad R_2 = 2.4 \times 10^{-10}$$

$$\Leftrightarrow \quad n = 0.326$$



The zinc oxide doped with two more oxygen atoms is a room-temperature superconductor.

The palladium charged with deuterium is not a superconductor.

Other examples:



H 1.67 -27 1.99																	He 6.64 -27 2.59
Li 1.15 -26 2.16	Be 1.50 -26 1.56											B 1.79 -26 1.52	C 1.99 -26 1.60	N 2.33 -26 2.05	O 2.66 -26 2.24	F 3.15 -26 2.17	Ne 3.35 -26 2.38
Na 3.81 -26 2.93	Mg 4.04 -26 2.45											Al 4.48 -26 2.21	Si 4.66 -26 2.36	P 5.14 -26 2.63	S 5.32 -26 2.57	Cl 5.88 -26 2.93	Ar 6.63 -26 3.15
K 6.49 -26 4.12	Ca 6.65 -26 3.42	Sc 7.46 -26 2.86	Ti 7.95 -26 2.56	V 8.46 -26 2.35	Cr 8.63 -26 2.26	Mn 9.12 -26 2.29	Fe 9.27 -26 2.30	Co 9.78 -26 2.20	Ni 9.74 -26 2.14	Cu 1.05 -25 2.20	Zn 1.09 -25 2.38	Ga 1.16 -25 2.61	Ge 1.21 -25 2.73	As 1.24 -25 2.68	Se 1.31 -25 2.92	Br 1.33 -25 3.40	Kr 1.39 -25 3.67
Rb 1.42 -25 4.94	Sr 1.45 -25 4.19	Y 1.48 -25 3.52	Zr 1.51 -25 3.14	Nb 1.54 -25 2.90	Mo 1.59 -25 2.75	Tc 1.64 -25 2.66	Ru 1.68 -25 2.66	Rh 1.71 -25 2.65	Pd 1.77 -25 2.62	Ag 1.79 -25 2.77	Cd 1.87 -25 3.00	In 1.91 -25 3.20	Sn 1.97 -25 3.24	Sb 2.02 -25 3.37	Te 2.12 -25 3.50	I 2.11 -25 3.80	Xe 2.18 -25 4.53
Cs 2.21 -25 5.92	Ba 2.28 -25 4.89	Lu 2.91 -25 4.42	Hf 2.96 -25 3.46	Ta 3.00 -25 3.23	W 3.05 -25 3.06	Re 3.09 -25 3.02	Os 3.16 -25 2.98	Ir 3.19 -25 3.01	Pt 3.24 -25 2.95	Au 3.27 -25 3.07	Hg 3.33 -25 3.46	Tl 3.39 -25 3.66	Pb 3.44 -25 3.74	Bi 3.47 -25 3.96	Po 3.47 -25 4.06	At	Rn

Table of m and R of the elements

Example: Hydrogen $m = 1.67 \times 10^{-27}$; $R = 1.99 \times 10^{-10}$

Calculation of R:

$$\text{Density } \rho = \frac{m}{\frac{4}{3}\pi R^3} \quad \Leftrightarrow \quad R = \sqrt[3]{\frac{3m}{4\pi\rho}}$$